

LII.—*Notes on the Classification of Scorpions, followed by some Observations upon Synonymy, with Descriptions of new Genera and Species.* By R. I. POCKOCK, of the British (Natural History) Museum.

[Plates XIV. & XV. B.]

PART I.—*Notes on Classification.*

THE first part of the following paper is a brief summary of my views respecting the mutual relationships of the genera of Scorpions. But since no special attention has been here devoted to the Buthidæ and Bothriuridæ, most of what is new is expressed in the rearrangement of the genera of the groups that Thorell ascribed to his two families Pandinoidæ and Vejovoidæ.

The characters I have used are taken exclusively from the external structure*. With one exception all have been pointed out before or utilized, with a varying measure of success, by my predecessors, Peters, Thorell, Simon, Lankester, and Karsch. The character that I believe to be new and, I hope, of considerable importance is the presence or absence of one of the spurs of the pair that is found upon the articular membrane connecting the foot or terminal segment of the legs with the segment that precedes it. These I call the pedal spurs. It is necessary to distinguish carefully between these spurs and the spines or thickened hairs which frequently project downwards over the foot-joint from the distal extremity of the segment to which the foot is articulated. In the Scorpionidæ, as recognized by me, there is only one of these spurs, the anterior; in the Iuridæ, Bothriuridæ (with one exception), and the Buthidæ both are present, and they attain their maximum of development in the Buthidæ, where we find the anterior one frequently double.

Of course it is hardly expected that this character, more than any other, will prove invariable; but it adds one more to the sum of characters upon which, as I have long suspected, the families or subfamilies of Scorpions must be based. Especially important has it been in my estimation in showing the relationship between such genera as *Urodacus* and *Hemi-*

* I have consequently not mentioned the anatomical features connected with the innervation and structure of the lung-books described by Prof. Lankester in 1885. It would be a highly interesting study for any one with the time to devote to it to see how far a classification based upon internal anatomy would agree with one such as that put forward here.

scorpius and, e. g., *Scorpio*, and the wide difference between *Euscorpius* and the Ischnurine group.

It is not my intention on the present occasion to enter upon any criticism of the classifications proposed by the authors mentioned above. I will merely represent these classifications in tabular form, so that a glance will suffice to show how the new grouping of the genera agrees with or differs from those that have been published before.

PETERS, Mon. Ak. Wiss. Berlin, 1861 *, pp. 509-513.

Group 1. TELEGONINI.

Telegonus, *Cercophonius*, *Bothriurus*.

Group 2. SCORPIONINI.

A. *Vejois*.

B.—a. *Broteas*, *Euscorpius*, *Scorpiops*, *Urodacus*.

b. *Hemiscorpius*, *Ischnurus*, *Opisthacanthus*, *Heterometrus*, *Diplocentrus*.

Group 3. CENTRURINI.

Centrurus (*Tityus*, *Isometrus*), *Uroplectes*.

Group 4. ANDROCTONINI.

Prionurus, *Buthus*.

THORELL, Ann. & Mag. Nat. Hist. (4) xvii.
pp. 3 &c. (1876).

Fam. I. **Androctonoidæ**.

Subfam. 1. ANDROCTONINI = *Androctonini*, Pet.

Subfam. 2. CENTRURINI = *Centrurini*, Pet., + some more genera.

Fam. II. **Telegonoidæ** = *Telegonini*, Pet.

Fam. III. **Vejovoidæ**.

Vejois, *Hadrurus*.

Fam. IV. **Pandinoidæ** = *Scorpionini*, Peters, - *Vejois*.

Subfam. 1. IURINI.

Iurus, *Uroctonus*.

Subfam. 2. PANDININI.

A. *Diplocentrus*, *Heterometrus*, *Pandinus*, *Palamncus*,
Micophonus, *Opisthophthalmus*, *Opisthacanthus*,
Hormurus, *Ischnurus*, *Hemiscorpius*.

B. *Urodacus*, *Broteas*, *Scorpiops*, *Loctonus*, *Chactas*,
Euscorpius.

* Until 1861 there can scarcely be said to have been a classification of Scorpions at all.

SIMON, 'Les Arachnides de France,' vii. pp. 92 &c. (1879).

Fam. I. **Buthidæ** = *Androctonoideæ*, Thor.

Fam. II. **Telegonidæ** = *Telegonini*, Pet.

Fam. III. **Vejovidæ** = *Vejovoideæ*, Thor.

Fam. IV. **Heterometridæ** = *Pandinoideæ*, Thor., in part.

Scorpio, Heterometrus, Opisthophthalmus, Nebo, Iurus.

Fam. V. **Ischnuridæ** = *Pandinoideæ* in part.

Ischnurus, Euscorpius, Belisarius.

Fam. VI. **Broteidæ** = *Pandinoideæ* in part.

Broteas.

M. Simon unfortunately does not assign any position in this system to many important genera.

KARSCH, Mitth. Münch. ent. Ver. 1879, pp. 17-22.

This classification is a copy of the one proposed by Thorell, the only alterations of any value that are made being concerned with the location of some of Peters's genera, which Thorell had not seen.

In the Zeitschr. Naturwissen. (3) v. p. 408 (1880), Dr. Karsch suggested the name *Diplocentrini* for the genera *Diplocentrus* and *Cyphocentrus*.

RAY LANKESTER, Trans. Zool. Soc. ii. (1885), pp. 379, 380.

Fam. **Scorpionidæ.**

Subfam. 1. SCORPIONINI.

Genus 1. *Scorpio*, including as subgenera *Euscorpius*, *Buthus* (*Heterometrus*), and *Broteas*.

Genus 2. *Telegonus*.

Subfam. 2. ANDROCTONINI.

Genus *Androctonus*, with subgenera *Prionurus* and *Centrurus*.

The value of this paper consists in the excellence of the figures and in the attention that is drawn to some new points of structure.

The Classification here proposed.

Fam. I. **Scorpionidæ.**

Subfam. 1. SCORPIONINI = *Heterometridæ*, Sim., - *Nebo* and *Iurus*.

Scorpio, Heterometrus, Micophonus, Ecopetrus, Opisthophthalmus, Palamnceus.

- Subfam. 2. ISCHNURINI = *Ischnuridæ*, Sim., - *Euscorpius* and *Belisarius*.
Ischnurus, *Opisthacanthus*, *Opisthocentrus*, *Cheloctonus*,
Chiomachus, *Hormurus*, *Iomachus*.
- Subfam. 3. DIPLOCENTRINI = *Diplocentrini*, Karsch, + *Nebo*.
Diplocentrus, *Oiclus*, *Nebo* (*Cyphocentrus*).
- Subfam. 4. HEMISCORPIINI, nov.
Hemiscorpius.
- Subfam. 5. URODACINI, nov.
Urodacus (*Iodacus*), ? *Ioctonus*.
- Fam. II. **Iuridæ**.
 Subfam. 1. IURINI = *Iurini* + *Vejovoidæ*, Thor.
Scorpiops, *Iurus*, *Uroctonus*, *Anuroctonus*, *Vejois*,
Hadrurus, *Caraboctonus*, *Hadruroides*.
- Subfam. 2. CHÆRILINI = *Iurini*, Karsch, in part.
Chærilus.
- Subfam. 3. CHACTINI.
 a. *Euscorpius*.
 b. *Chactas*, *Hadrurochactas*, *Heterochactas*, *Teuthraustes*, *Broteochactas*, *Broteas*.
- Fam. III. **Bothriuridæ**, Sim., = *Telegonidæ* anct.
Bothriurus, *Brachistosternus*, *Mecocentrus*, *Cercophonius*,
Timogenes, *Thestylus*, *Urophonius*, *Phoniocercus*.
- Fam. IV. **Buthidæ**, Sim.
Prionurus, *Buthus*, *Parabuthus*, *Grosphus*, *Butheolus*,
Archisometrus, *Isometroides*, *Uroplectes* (*Lepreus*,
Tityolepreus), *Tityobuthus*, *Pseudobuthus*, *Isometrus*,
Tityus, *Centrurus*, *Heteroctenus*, *Ananteris*,
Charmus, *Heterocharmus*, *Stenochirus*.

Family Scorpionidæ.

The feet furnished with a single anterior pedal spur.

Sternum large, pentagonal.

Halves of the genital operculum united in the ♀, separated in the ♂.

Stigmata elongate, narrow.

A single row of teeth on each digit of the chelicerae.

Subfamily SCORPIONINI.

Median eyes not in front of the middle of the carapace, sometimes very much behind the middle; three lateral eyes on each side.

Sternum longer than wide, its sides parallel or slightly converging anteriorly.

The penultimate tooth on the movable digit of the chelicerae small, very rarely approaching the size of the terminal.

Digits of the chelæ with their opposable edges angularly notched.

Bases of the claws of the legs concealed laterally by lobate expansions of the extremity of the feet; feet furnished beneath with two subparallel series of strong spines (the anterior series sometimes obsolete, e. g. *Miephonus*).

Pectines of medium length.

Tail powerful or moderately so, without a spine beneath the aculeus.

In the male the tail and chelæ are often elongate, the hands being thinner than in the female; the digits, however, do not appear to be lobate and sinuate basally as in many other scorpions.

Genera: *Scorpio*, Linn.; *Heterometrus*, Hempr. & Ehrenb.; *Miephonus*, Thor. (syn. *Mossamedes*, Sim.); *Æcopetrus*, nom. nov.*; *Opisthophthalmus*, C. Koch; *Palamnceus*, Thor.

Distribution. Ethiopian and Oriental Regions.

Subfamily *ISCHNURINI*.

Resembling the Scorpionini, but differing in having:—

The feet not distally lobate and not armed beneath in the same way.

The penultimate fang of the *chelicerae* subequal to the terminal.

The *sternum* very wide, with parallel or diverging sides.

The *pectines* usually shorter.

The *tail* weaker and distinctly compressed.

Characters of male as in the Scorpionini, except that the digits are generally lobate and sinuate at the base.

Genera: *Ischnurus*, Gervais; *Opisthacanthus*, Peters; *Opisthocentrus*, nov.; *Cheloctonus*, Pocock; *Chiro-machus*, nov.; *Hormurus*, Thorell; *Iomachus*, nov.

Distribution. Ethiopian, Oriental, Australian, and North Neotropical Regions.

Subfamily *DIPLOCENTRINI*.

Differs from the Scorpionini in having:—

A distinct tubercle beneath the aculeus of the tail.

* For *Petrooicus*, Karsch, preoccupied as *Petroica* (*Petraea*) in Aves.

The ocular tubercle in front of the middle of the carapace.
The feet not or at least less lobate.

Male with a longer tail and longer pectines; digits sinuate and lobate in *Nebo*, but apparently not in *Diplocentrus*.

Genera: *Diplocentrus*, Peters; *Oiclus*, Simon; *Nebo*, Simon (syn. *Cyphocentrus*, Karsch).

Distribution. Northern Neotropical, Arabia.

Subfamily *HEMISCORPIINI*.

A subfamily presenting interesting annectent features.

The median eyes in advance of the middle of the carapace, as in the Diplocentrini.

The penultimate fang of the chelicerae large, as in the Ischnurini and Diplocentrini.

Feet armed beneath, as in the Diplocentrini, but with the claws entirely free, as in the Ischnurini, and with a fine median series of spicules.

Sternum elongate, parallel-sided.

Tail with a median keel, as in the Urodacini.

Male with a long tail, the vesicle symmetrically dilated at the base of the aculeus.

Genus: *Hemiscorpius*, Peters.

Distribution. Arabia.

Subfamily *URODACINI*.

Resembling the Scorpionini, but differing in having:—

Two lateral eyes on each side.

A single inferior median keel on the tail.

The digits of the chelae not angularly notched.

Male with a long tail and long pectines; chelae apparently unmodified.

Genus: *Urodacus*, Peters (syn. *Iodacus*, Pocock); *Ioctonus*, Thorell.

Distribution. Australia.

Family *Iuridæ*.

Feet furnished with two distinct pedal spurs.

Sternum pentagonal, very variable as regards its length and breadth, but nearly always wider than long.

The lower surface of the feet nearly always compressed and furnished with a median series of spicules or tufts of hair.

Subfamily IURINI.

Sternum longer than wide or wider than long, its posterior half with a deep median longitudinal groove.

Feet not laterally spined beneath, but furnished with a median series of spinules or tufts of hair.

Three lateral eyes on each side.

The movable digit of the chelicerae is very generally furnished with a tooth or teeth on its inferior edge, but the corresponding border of the immovable is unarmed.

Genera: *Scorpiops*, Peters; *Iurus*, Thorell; *Uroctonus*, Thorell; *Anuroctonus**, gen. nov.; *Vejovis*, C. Koch; *Hadrurus*, Thorell; *Caraboctonus*, Pocock; *Hadruroides* †, gen. nov.

Distribution. Mediterranean, N. India and Burma; S. Neartic to Chili.

Considering the wide geographical range of this group and the difference of aspect presented by such of its members as *Scorpiops* and *Hadrurus*, one would be inclined to think the assemblage an unnatural one. But the intermediate forms that exist seem to show that this is not the case. For instance, from *Scorpiops* to *Iurus* is not a great leap; and similarly we can proceed from *Iurus* through *Uroctonus* and *Anuroctonus* to *Vejovis*, or through *Hadruroides* and *Caraboctonus* to *Hadrurus*. *Hadrurus* undoubtedly differs very much from *Iurus*, but no one will probably dispute that it is nearly allied to *Caraboctonus*; and the similarity that obtains between *Caraboctonus* and *Iurus* with respect to armature of the mandible, the hairy clothing of the soles of the feet, &c., may surely, when taken in conjunction with the other features already pointed out as characteristic of the Iurini, point to real kinship between the two.

Subfamily CHERILINI.

Sternum long, as long or longer than wide, with a posterior rounded impression, the lateral portions of its posterior half not thrust up on each side of the middle line.

Pectines very short, with all the intermediate lamellae except a proximal piece obsolete, and the teeth very large.

Stigmata circular.

Two lateral eyes on each side.

* For *Centrurus phæodactylus*, Wood, cf. *infra*

† For *Hadrurus charcasus*, Karsch, cf. *infra*.

A series of small teeth on the lower edge of both the digits of the chelicerae.

Digits of the chelae furnished with a number of short overlapping series of denticles.

The lower surface of the feet furnished with two rows of spines, and a very fine median series of spicules.

Genus: *Chærilus*, Simon, with which *Chelomachus*, Thorell, and *Uromachus*, Pocock, are in all probability synonymous.

Distribution. From N. India, through Burma to Java and Sumatra.

The genus *Chærilus* appears to have its nearest ally in *Scorpiops* of the subfamily Iurini. The two agree in geographical distribution as well as in some structural features, such as the form of the sternum, shortness of the pectines, and dentition of the movable digit of the chelicerae.

Subfamily CHACTINI.

With two lateral eyes on each side of the carapace.

Inferior edge of the movable digit of the chelicerae unarmed.

- a. S. European forms, with flattish body and chelae, compressed weak tail, large sternum, distinct fulera, and intermediate lamellae on the pectines, small oval stigmata, and the feet compressed beneath and furnished with a row of spicules.

Genus: *Euscorpius*, Thor.

- b. Neotropical forms, with the body and palpi more convex, the median eyes more forward, the sternum not so large, the intermediate lamellae of the pectines undivided, and the fulera small and often membranous; the stigmata are either elongate as in *Broteas*, or subcircular as in the rest; the feet as in *Euscorpius*, or with two rows of spines.

Genera: *Broteas*, C. Koch; *Broteochactas*, Pocock; *Teuthraustes*, Simon; *Heterochactas*, Pocock; *Chactas*, Gerv.; *Hadrurochactas*, Pocock.

It is possible that *Euscorpius* may not belong to this subfamily; but it is not easy to see where else to place the genus unless a special subfamily be erected for its reception.

Family Bothriuridae, Simon.

Scorpions of small or medium size.

Carapace with the median eyes situated in the middle or a little in front of it; 3 lateral eyes.

Sternum reduced to a transverse anteriorly angularly convex and posteriorly concave sclerite, transversely but scarcely longitudinally impressed, wedged in between the genital operculum and the ingrown coxæ of the appendages of the fourth pair.

Genital operculum large.

Pectines moderately or very long, with clearly defined fulcra and intermediate lamellæ.

Appendages.—The penultimate tooth on the movable digit of the chelicerae very short; the digits of the chelæ not angularly notched; the denticles arranged in three series—an external and internal, consisting of larger separated teeth, and a median, consisting of a single or double, rarely (*Cercophonius*) a multiple series of smaller teeth.

Feet with two pedal spurs (rarely the posterior obsolete, *Phoniocercus*); the lower surface furnished with more or fewer lateral spines and a median series of hairs or spicules.

Tail mostly powerful, its keels largely obsolete, with no spine beneath the aculeus.

♂ (? in all genera) with a tooth on the inner surface of the hand; digits not lobate.

♀ with cleft genital operculum.

Genera: *Bothriurus*, Peters; *Brachistosternus*, Pocock; *Cercophonius*, Peters; *Mecocentrus*, Karsch; *Phoniocercus*, Pocock; *Thestylus*, Simon; *Timogenes*, Simon; *Urophonius*, Pocock.

Distribution. S. Neotropical, Australia, Sumatra.

The scorpions of this group seem to be little more than an exaggeration of some of the American members of the Iurini, for some of them show many points of resemblance to *Caraboctonus* and *Hadrrurus*.

Family Buthidæ, Simon.

Feet furnished with two pedal spurs, the anterior of which is often double.

Sternum small, triangular or pentagonal.

Ocular tubercle in front of the middle of the carapace; 3 to 5 lateral eyes on each side.

The movable digit of the chelicerae with the penultimate fang subequal to the terminal; its inferior edge armed with teeth; the lower edge of the immovable also generally armed.

The hands of the palpi are rounded and the digits long.

♂. With the tail and palpi usually longer and thinner or

much thicker and scarcely longer; pectines longer; operculum divided in both sexes.

Distribution. Tropical and temperate countries.

Genera: *Prionurus*, Hempr. & Ehrenb.; *Buthus*, Leach; *Parabuthus*, Pocock (syn. *Heterobuthus*, Kraep.); *Grosphus*, Sim.; *Butheolus*, Sim. (syn. *Orthochirus*, Karsch); *Archisometrus*, Kraep.; *Isometroides*, Keys.; *Uroplectes*, Pet. (?syn. *Lepreus*, Thor., and *Tityolepreus*, Kraep.); *Tityobuthus**, gen. nov.; *Pseudobuthus*, nom. nov.†; *Isometrus*, Hempr. & Ehrenb.; *Tityus*, C. Koch; *Centrurus*, Hempr. & Ehrenb.; *Heteroctenus*, Pocock; *Ananteris*, Thor.; *Charmus*, Karsch; *Heterocharmus*, Pocock; *Stenochirus*, Karsch.

In many respects this family, like the preceding, shows signs of relationship with the Iurini. One of the genera even—*Charmus*—was referred by its author to the latter subfamily of the Pandinidæ.

A few of the above genera are unknown to me and others I have not attempted to locate.

Timogenes and *Thestylus* are referred to the Bothriuridæ on the authority of Simon (Ann. Soc. Ent. Fr. 1880, p. 392 &c.).

Megacormus.—This genus was established by Karsch in Arch. Naturgeschichte, 1881, p. 17, for a species named *granosus* by Gervais. It was compared by Karsch to *Urodacus*. Possibly it belongs to the Chactini, but nothing is known respecting the armature of its feet.

Belisarius, Sim. (Arach. de France, vol. vii.), referred to the Ischnuridæ, should perhaps constitute a distinct family or subfamily.

Hoplocystis, of which there is a single species, *scintilla*, was characterized by Karsch (Abh. nat. Ver. Bremen, ix. p. 69, 1884), and was referred by its author to the Iurini. I would suggest, however, that it may be one of the Buthidæ. The locality is unknown.

Ioctonus of Thorell, from Australia, I have questionably united with *Urodacus*, principally relying upon the locality

* For *Rhoptrurus Baroni*, Pocock, from Madagascar, differing from *Rhoptrurus*, i. e. *Pseudobuthus*, at least in having a spur on the tibiæ of the legs of the third pair.

† For *Rhoptrurus*, Karsch, preoccupied by Peters for a snake.

and upon what is stated respecting the situation and structure of the ocular tubercle.

Ananteris, Thor., I have not seen. *Charmus*, *Heterocharmus*, and *Stenochirus* are, I suspect, identical.

PART II.—*Descriptions of new Genera and Species.*

Family Buthidæ.

Tityus asthenes, sp. n.

Upper surface of the trunk lurido-fuscous; tail fulvous, fulvo-brunneous towards its posterior end; legs, palpi, and lower surface flavous, with the exception of the digits which are fuscous.

The upper surface of the trunk much more finely granular than in *T. americanus*.

Tail longish and slender, about five and a half times the length of the carapace, the second segment about the same width as the fifth, the intercarinal spaces very finely granular, the keels not very strong, granular, the terminal granule of the superior keels not larger than the rest; the median lateral keel not present on the second segment; the vesicle a little narrower than the fifth segment, wider than it is high, with a large spine beneath the sting as in *T. americanus*.

Palpi long and slender, finely granular, and normally carinate; on the hand the external of the three keels which run from the immovable digit is entire as in *T. stigmurus* (Thor.); hands a little wider than the brachium, the digits long, slender, in contact, furnished with 14–15 median rows of teeth, the movable twice the length of the hand-back, longer than the fifth caudal segment, and much longer than the carapace.

Pectines furnished with 19 teeth, the basal intermediate lamella internally expanded. The sterna coriaceous, being studded with low smooth-topped granules.

Legs long; the lower surface of the feet studded with a few setæ.

Measurements in millimetres.—Total length 55, length of carapace 5·8, of tail 34; width of first segment 2·6, of fifth 2·3; length of fifth segment 7; width of vesicle 2, of hand 2; length of hand-back 4, of movable digit 8.

A single female example from Poruru (Peru).

This species belongs to the same category as *T. americanus*, but from this last-named it may be recognized by its much greater smoothness, difference in colour, slender tail, &c.

Tityus Quelchii, sp. n. (Pl. XIV. fig. 1.)

Closely allied to *T. columbianus* (Thor.).

Colour fulvous or flavous, nigro-maculate.

Carapace blackish laterally and mesially behind the black ocular tubercle, the interocular portion and the sides of the upper surface lurid and almost immaculate; the tergites with their posterior angles widely flavous, with two other conspicuous flavous spots along the posterior border on each side of the middle line; the tail obscurely variegated with fuscous patches and spots; the fifth segment and the vesicle much darker, sometimes uniformly fuscous; chelicerae fuscous distally; palpi fusco-flavo-maculate; the brachium darker at its distal end and the immovable digit at the base; digits fusco-maculate; legs nigro-maculate; apices of the maxillary lobes of the first and second pairs of walking-legs fuscous. *Sterna* fulvo-brunneous, obscurely mottled with fuscous.

Carapace and *tergites* granular throughout; the sides of the ocular tubercle granularly carinate, and the carapace posteriorly bicarinate; tergites with a posterior median granular keel, and a curved transverse granular crest; the seventh tergite with the keel well developed.

Tail nearly parallel-sided, rather more than four and a half times the length of the carapace, the intercarinal spaces granular, the keels strong and granular; the second segment with only a posterior vestige of the median lateral keel, the superior keels of the second, third, and fourth segments strongly elevated behind and terminating in a larger tooth, the upper surface of the fifth weakly sulcate in the middle, nearly smooth behind, the edges squared and granular; vesicle compressed, much narrower than the fifth segment, smooth and punctured above, serially granular beneath, mesially carinate, the spine beneath the sting deep and compressed, very conspicuous, armed above with two spinules.

Palpi finely and closely granular throughout, all the normal keels well developed and granular; hand strongly carinate, rounded, a little narrower than the brachium; the movable digit long and slender, twice the length of the hand-back, furnished with 11-12 rows of teeth along the middle series.

Legs carinate and granular, the soles of the feet furnished with long closely-set hairs.

Sterna finely granular throughout, the fifth furnished with four granular keels, the fourth obsoletely bicarinate posteriorly, and the third furnished with a median posterior smooth polished area.

Pectines furnished with 15–16 teeth; the basal intermediate lamella not produced.

Measurements in millimetres.—Total length 40·5, length of carapace 4·8, of tail 23; width of second and fifth caudal segments 2·3, of vesicle 1·5.

Two female specimens from British Guiana collected by Mr. J. J. Quelch, to whom I have great pleasure in dedicating the species.

This species differs from *T. columbianus* in being paler in colour, especially beneath, but chiefly in having the spine on the vesicle of the tail very large and triangular.

The British Museum has also a dried specimen of a scorpion which I believe to be the male of *T. Quelchii*, from Para. In this specimen the tail is long and slender, being nearly six times the length of the carapace. The whole animal measures about 34 millim.

Tityus pusillus, sp. n.

♀. Nearly related to the preceding, but more distinctly spotted with black; the maxillary lobes, however, are not fuscous, and the fifth caudal segment and the vesicle of the tail are of the same tint as the rest of the tail and not conspicuously infuscate as in *T. Quelchii* and *T. columbianus*.

Trunk carinate and granular above as in the preceding species; the lower surface perhaps rather more coarsely and closely granular.

Tail a trifle more than five times the length of the carapace, slender, nearly parallel-sided, the fifth segment being only very slightly wider than the second; the vesicle a little more globular than in *T. Quelchii*, with proportionately larger tooth, but with much less distinctly defined granules; the fifth caudal segment also less distinctly granular, and the terminal tooth of the superior caudal keels is only a little larger than the rest upon the third and fourth segments.

Palpi and *legs* as in *T. Quelchii*, but with 14–15 rows of teeth along the middle series of the digit.

Pectines with 16–17 teeth, the basal intermediate lamella slightly produced.

Measurements in millimetres.—Total length 32, length of carapace 4, of tail 20+; width of fifth caudal segment 1·6, of vesicle 1·3.

♂. A little smaller and slenderer than female, with tail slightly longer, being a little more than five and a half times the length of the carapace. *Pectines* much larger, with 17–18 teeth.

Two specimens in alcohol, collected by Mr. G. A. Ramage at Iguarassu.

Family Scorpionidæ.

Subfamily *ISCHNURINI*.OPISTHOCENTRUS, gen. nov.
(Pl. XIV. figs. 2 and 3.)

Differs from *Opisthacanthus*, Peters, of which *elatus*, Gervais, is the type, in that the anterior border of the carapace is less deeply excised, the lateral eyes less prominent and either subequally spaced or with the distance between the posterior and median greater than that between the median and anterior, in having only a small projection on the anterior aspect of the brachium, in having the genital operculum very much smaller, being shorter, in fact, than the side of the sternum, and much wider than long, in having the pectines narrower at the base, and the tactile area of the teeth limited to the posterior distal extremities of these organs.

Type, *O. africanus* (Simon).

I establish this genus for those species of *Opisthacanthus* that have been described from Africa. So far as my examination extends these African species differ in a number of characters from the South American form *Opisthacanthus elatus*. It may be that these characters are of small value in themselves, and it would be bold to assert that every one of them is of itself of generic importance. But the aggregate value of them all, coupled with the wide difference in the geographical distribution of the two types, is sufficient, I think, to justify the adoption of the view of their importance that is here put forward.

In *Opisthacanthus elatus* the carapace is deeply excised in the middle line, the lateral eyes are prominent, the space between the anterior and median being greater than that between the median and posterior; there is a large dentiform prominence upon the brachium as in *Ischnurus* and *Hormurus*; the genital operculum is large, being nearly as long as wide, and longer than the side of the sternum, in the female it is heart-shaped, being noticeably produced posteriorly; the pectines are generally very wide at the base, owing to the size of the basal intermediate lamella, and the teeth appear to have been rotated so that the tactile areas which generally look distally and externally are entirely external and extend over nearly the whole of the exposed surface of the organ (at least in the male).

Opisthocentrus africanus, Simon.

Opisthacanthus africanus, Simon, Bull. Soc. Zool. Fr. i. p. 221 (1876).
Opisthacanthus 7-dentatus, Karsch, Zeits. Naturwiss. 1879, p. 372; and
 Berl. ent. Zeits. xxx. p. 79 (1886); but not *Scorpio 7-dentatus*, Pal.
 de Beauvois, Ins. rec. en Afr. et Amér. &c. p. 191, pl. v. fig. 5
 (1805).

This species seems to be not uncommon in the neighbourhood of the Congo. The British Museum has two examples ticketed Guinea, four ticketed Congo, seven from Cette Cama (Gaboon), and one from Stanley Falls.

Dr. Karsch, who has more than once discussed this species, can scarcely be congratulated upon the success of his attempt to establish its synonymy. This author made two suggestions on this head—firstly, that Simon had described as *africanus* the species named *Lecomtei* by Lucas, and secondly, that *Lecomtei* had been previously described as *septem-dentatus* by Palisot de Beauvois.

The last view, however, is really too extravagant for serious discussion, for a glance at Palisot de Beauvois's figure is sufficient to show that the scorpion represented is a thick-tailed form which can have no near relationship with any of the genera of the *Opisthacanthus* group; while, brief though the description is, it nevertheless asserts quite plainly that the specimen examined had six eyes; and seeing that all the species of *Opisthacanthus* have eight eyes, we may without further comment dismiss the question and may pass on to consider the learned author's first supposition, namely, that *africanus* is a synonym of *Lecomtei*. But although this opinion is not, like the other, *primâ facie* absurd, it will nevertheless not bear the light of close criticism; for the description of *Lecomtei* fails to apply to specimens of *O. africanus* in one or two particulars—notably in the fact that Lucas's specimens had a larger number of pectinal teeth, a smooth carapace, and apparently the frontal lobes of the carapace more triangular and separated by a deeper excision. Perhaps these considerations left in Karsch's mind that element of doubt respecting the synonymy which is expressed by a mark of interrogation; but if so it seems a pity that without further light being shed upon the matter the questionableness of the accuracy of the synonymy should be apparently entirely forgotten before seven years were over. For in 1886 we find a species of *Opisthacanthus* described by Karsch and named as new *duodecim-dentatus*. This scorpion came from the same locality as *Lecomtei* and *africanus*; and it is, I should say, certainly distinct from the latter, with which, as *7-dentatus*, Karsch

compares it, entirely forgetting apparently the possibility of the existence of *Lecomtei*. As a matter of fact, the characters that are given to distinguish 12-*dentatus* from 7-*dentatus*, i. e. *africanus*, are precisely those which one would pick out as distinguishing *Lecomtei* from *africanus*. So that it is only reasonable to suppose that 12-*dentatus* is a synonym of *Lecomtei*, and such I shall consider it to be until evidence to the contrary is forthcoming.

Opisthocentrus Lecomtei (Lucas).

Ischnurus Lecomtei, Lucas in Thomson's Arch. Ent. ii. p. 428 (1858).

Opisthacanthus duodecim-dentatus, Karsch, Berl. ent. Zeits. xxx. p. 79 (1886).

This species, which like *africanus* is a West-African form, is unknown to me. Nevertheless there can, I think, be little doubt that the synonymy given above is correct (cf. *suprà* sub *O. africanus*).

This species differs from the preceding, *africanus*, as well as from the following *validus*, in having 10-12 pectinal teeth and a smooth carapace; possibly also in other characters which will be pointed out when specimens fall into competent hands for examination.

Opisthocentrus validus (Thor.).

Opisthacanthus validus, Thor. Act. Soc. Ital. p. 243 (1877).

Opisthacanthus capensis, id. *ibid.*

Hormurus diremptus, Karsch, Mitth. Munch. ent. Ver. 1879, p. 129.

Hormurus asiaticus, Keyserling, Die Arachn. Austral., Scorpiones, p. 24, pl. iii. fig. 1 (1885).

This species is evidently not uncommon in South Africa. Thorell's *validus* and Karsch's *diremptus* were from Caffraria, and the former author's var. *capensis* from the Cape of Good Hope. The British Museum has examples from S. Africa (*Drs. Smith and Quain*), Port Elizabeth (*Messrs. Leslie and Drège*), King Williamstown (*Mr. Trevelyan*), East London and Natal (*Mr. Howlett and Prof. Lankester*), as well as two others which are without history. One of these latter, a young form, agrees exactly with Karsch's description of *H. diremptus*. As for Keyserling's *H. asiaticus*, there can be no doubt that it is the same species, though the vague locality, East Indies, is in all probability erroneous.

This species varies a good deal in the colouring of its legs, the compression and denticular armature of its poison-vesicle, &c., and it is possible that it may ultimately be capable of being split up into several local forms.

It may be at once recognized from the W.-African *O. africanus* by its much smaller median eyes and the much greater development of the keels on the lower surface of the tail.

Opisthocentrus levipes, sp. n.

Most nearly allied to *O. validus*, Thor.

Colour olivaceo-ochraceous; palpi more ferruginous; legs, lower surface, and vesicle pale ochraceous.

Carapace rather flat, finely punctured throughout, and finely granular behind at the sides and in front of the ocular tubercle; the anterior excision rather shallow; the frontal lobes not so triangular as in *validus*; *eyes* as in that species.

Trunk smooth, minutely punctured throughout; the last wrinkled; *sternites* also smooth and minutely punctured, the last furnished with a shallow groove.

Tail of the ordinary form, less than three times the length of the carapace, which is as long as the first two segments and half the third; its upper surface mesially grooved, weakly granular at the sides, but scarcely carinate except on the fourth; lateral surface smooth, punctulate, with an obsolete keel; the inferior surface distinctly keeled, the keels granular on the fourth, denticulate on the fifth; vesicle compressed, serially granular below.

Palpi rather flat; the normal keels coarsely granular, and the dorsal intercarinal spaces finely so; *hand* flatter than in *validus* or *africanus* and much smoother, the reticulated pattern finer and much less deep; hand-back considerably longer than the width of the hand, of which the inner border is lightly convex and coarsely and sharply tubercular; digits moderately long, the immovable more strongly bent at the apex than in *africanus* or *validus*.

Legs smooth and minutely punctulate; the femora of the anterior three pairs granular and carinate below.

Pectines furnished with eight teeth.

Measurements in millimetres.—Total length 97, of carapace 15, of tail 43·5; width of brachium 5·5, of hand 10·5; length of hand-back 13, of movable digit 14.

A single female example from the Sheba Mine, Transvaal, collected and presented by Dr. W. Percy Rendall.

The following synopsis of the African members of this genus will show some of the characters of the species recognized by me:—

- a. Carapace smooth; pectinal teeth 10-12 *Lecomtei* (Lucas).
 b. Carapace finely granular in parts; pectinal teeth
 6-8.
 a¹. Median eyes very large; inferior caudal keels
 obsolete *africanus* (Sim.).

- b*¹. Median eyes smaller; inferior caudal keels retained.
- a*². Carapace and palpi not so flat; hand coarsely reticulated above; femora of legs granular externally *validus* (Thor.).
- b*². Carapace and palpi flatter; hand smooth and only finely reticulated above; femora externally smooth *lævipes*, sp. n.

CHIROMACHUS, gen. nov. (Pl. XIV. fig. 4.)

Allied to *Opisthacanthus* and *Opisthocentrus*, but with the lower surface of the feet studded irregularly behind with long stiff setæ; the series of setæ diverging and becoming regularly arranged upon each side of the socket for the inferior claw.

In *Opisthacanthus* and *Opisthocentrus* the feet are armed below with two distally diverging series of spines.

Type, *C. ochropus* (C. Koch), of which the synonymy is, I believe, as follows:—

Chiromachus ochropus (C. Koch).

Ischnurus ochropus, C. Koch, Die Arachn. iv. p. 69 (1838), ♂.

Ischnurus asper and *chrysopus*, Peters, Mon. Ak. Wiss. Berlin, 1861, pp. 513–514, ♀.

This species appears to be an East-African form. The British Museum has six examples from Zanzibar, two without any history, and one which was brought from Round Island, near Mauritius, by Sir Henry Barkly.

IOMACHUS, gen. nov. (Pl. XIV. figs. 5 and 6.)

Allied to *Hormurus*, but differing in having the lower surface of the feet compressed and armed with a single series of spiniform teeth. The lateral setæ, which are characteristic of the feet in *Hormurus*, are fewer in number.

Type, *Hormurus læviceps* (Pocock), from S. India.

Subfamily URODACINI.

Genus URODACUS, Peters.

Urodacus, Peters, Mon. Ak. Wiss. Berlin, 1861, p. 511.

Iodacus, Pocock, Ann. Mag. Nat. Hist. (6) viii. p. 245.

Since establishing the genus *Iodacus*, I have found that the characters upon which it was based, namely, the longer sternum and flat hand, can scarcely be regarded as of generic importance, for an examination of recently received specimens of *U. novæ-hollandiæ* has shown that the length of the sternum is liable to considerable variation, and the new *Uro-*

dacus described below as *planimanus* reveals the same fact with respect to the flatness of the hand.

Urodacus abruptus, Pocock.

Urodacus abruptus, Pocock, Ann. Mag. Nat. Hist. (6) ii. p. 174.

Urodacus Keyserlingii, id. op. cit. viii. pp. 244, 245.

This species is smaller than *U. novæ-hollandiæ*, smoother, with more elevated superior caudal crests, a relatively stouter hand with weaker keels upon it. Moreover, the frontal lobes are rounder, separated by a deeper excision, and the ocular tubercle is shorter and better defined in front and behind.

This species seems to be common in S. and S.E. Australia. The type of the species (a dried specimen) came from Adelaide; but since it was described I have seen others in the Museum of Owens College, Manchester, which are ticketed Mt. Lofty, S. Australia, and Victoria.

One from the latter locality is a male, the sex which has not been hitherto described. It has 16-17 pectinal teeth, with a carapace measuring 6 and a tail 32 millim., the total length being 55 millim. A female from the same locality, measuring 63 millim., has the carapace 7.3 and the tail 31, and only 11 pectinal teeth; the genital operculum is very large, more than a semicircle, and longer than the sternum. This same form of genital operculum is shown in the types of *U. Keyserlingii*, a species which I now regard as identical with *abruptus*. In the male above referred to the superior caudal keels are elevated almost to the same extent as in *U. armatus*.

Urodacus planimanus, sp. n.

(Pl. XIV. fig. 7; Pl. XV. B. figs. 1, 1 a.)

Colour brunneo-ochraceous; legs, vesicle, chelicerae, and lower surface paler.

Carapace a little shorter than the first two caudal segments, its anterior border deeply and abruptly mesially excised, the lateral eyes not prominent; the halves of the ocular tubercle terminating behind the eyes; the area between the median and lateral eyes polished and finely punctured; the rest of the surface finely granular.

Tergites finely granular, the last with two granular keels on each side.

Sternites smooth, polished, the last marked with two sub-crenulate keels and very finely, closely granular posteriorly.

Tail four times as long as the carapace; posteriorly narrowed, compressed, slender, with finely granular intercarinal spaces, the keels finely denticulate; the upper keels of the

first four segments elevated and terminating behind in strong teeth; the segments straight-sided, the first a trifle longer than wide, the second much longer than wide, the fourth twice as long as wide; the median lateral keel of the fifth extending throughout half the length of the segment; vesicle as wide as the second segment, wider than the third, fourth, or fifth.

Palpi, humerus, and brachium flattish, normally keeled, finely granular above, the brachium with a smallish bifid tubercle on its anterior aspect, and with 8-9 pores on its lower surface in front of the keel; *manus* less than twice as wide as the brachium, keeled as in *novæ-hollandiæ*, but flat above, the upper and external surfaces being at right angles to each other as in *U. Darwinii*, the lower surface also flat and furnished with a series of 8-9 pores; the length of the hand-back greater than the width of the hand, but a good deal less than the length of the movable digit; the digits in contact, elongate, the immovable with three pores above, the posterior of which is well on the digit, and four externally.

Legs finely granular, the femora granularly carinate beneath.

Pectines just reaching the extremity of the posterior coxæ, furnished with 14 teeth.

Genital operculum a little shorter than the sternum, its posterior border semicircular.

Measurements in millimetres.—Total length 64, of carapace 8.5, of tail 35; width of first segment 3, of fourth 2.7, of fifth 2.5, of vesicle 2.8; manus, width of the upper surface 4.5, height 3.3; length of hand-back 7.2, of movable digit 8.2.

Locality. "Within 30 miles of Perth, W. Australia" (*H. W. J. Turner, Esq.*).

At once to be recognized from all the hitherto described species of *Urodacus* by its flat hands and thin tail. In both these characters it approaches *U. Darwinii*; but easily distinguishable on account of being finely granular, in having strongly elevated superior caudal keels, &c.

Urodacus Woodwardii, sp. n. (Pl. XIV. figs. 8 and 9.)

Allied to *U. novæ-hollandiæ* and to *U. abruptus*.

♀. *Colour* ochraceo-ferruginous, palpi redder, legs yellower.

Upper surface of the trunk very weakly granular, the tergites almost entirely smooth and polished.

Tail with the keels developed almost exactly as in *U. novæ-hollandiæ*, but the whole organ shorter, being only three and a half instead of four times the length of the carapace, and

stouter, the segments more excavated above; *vesicle* much more globular than in *novæ-hollandiæ*, being wider, higher, and shorter; *aculeus* also shorter and rather more curved.

Palpi almost as in *novæ-hollandiæ*, but the hands more robust.

The following measurements in millimetres of the type of this species (A) and of an example of *novæ-hollandiæ* (B) of the same sex and nearly the same size will show the differences between the two species with respect to the size of the tail and hands:—

A. Total length 48·5, of carapace 6·8, of tail 26; length of tail-segments 1 to 5, 2·7, 3·1, 3·5, 3·8, 5·8; width of the same segments, 3·5, 3·1, 3, 2·7, 2·5; vesicle, width 2·6, height 2, length 3·3; length of *aculeus* 2·3; width of brachium 2·1, of manus 5·5; length of hand-back 5·1, of movable digit 6·5.

B. Length of carapace 7, of tail 29; length of tail-segments 1 to 5, 3, 3·5, 3·9, 4·2, 7; width of the same segments, 3·2, 3, 2·9, 2·7, 2·5; vesicle, width 2·4, height 1·9, length 3·8; length of *aculeus* 3; width of brachium 2·5, of manus 4·5; length of hand-back 5·6, of movable digit 6·2.

Unfortunately I have only the one specimen of *U. Woodwardii* for examination; but small examples of *novæ-hollandiæ* from Perth, both older and younger than the one measured, show similar differences to it from the type of *U. Woodwardii*. This species also differs from *novæ-hollandiæ* in being much smoother and in having the frontal lobes of the carapace more rounded. In both these respects, as also in the robustness of the hand, it approaches *U. abruptus*, but in the latter the superior caudal keels are more elevated and posteriorly spiniform.

A single female example from the Darling Range (north of Perth), collected by B. H. Woodward, Esq.

Family Iuridæ.

Subfamily IURINI.

Scorpiops Petersii, sp. n. (Pl. XIV. fig. 10.)

Scorpiops Hurdwickii, Peters and Karsch (not of Gervais).

Colour blackish brown; feet, vesicle, and chelicerae yellow, with a smooth yellow spot at the extremity of the upper edge of the femur and a similar spot on the anterior face of the second segment of the palpi.

Carapace granular throughout, but not coarsely, the median groove smooth; the anterior border deeply excised, with

rounded lateral portions; the ocular tubercle small and low, the eyes also small and separated by a distance which is nearly twice a diameter; the distance between the posterior lateral eyes subequal, the posterior eye being a little further removed from the median than the latter is from the anterior.

Tergites studded in the posterior half with low smooth granules; a prominent subgranular median keel; the last furnished with 4 granular keels.

Sternites smooth, somewhat coarsely punctured and impressed, the last furnished with 4 weakly granular keels.

Tail nearly four times the length of the carapace, which is about as long as the first and second segments taken together, slender, posteriorly narrowed, all the segments except the first longer than wide, the fourth about twice as long as wide; the fifth segment about twice as long as the second; the normal keels well developed and coarsely granular, the spaces between them weakly granular, the terminal granule of the superior keels not enlarged; the median lateral keel complete on the first segment, just visible on the second, and extending throughout the anterior half of the fifth; the upper surface of the fifth nearly flat, with squared granular keels, the lower keels denticulate; the *vesicle* and *aculeus* a little longer than the fifth segment; the *aculeus* curved in its posterior half, about half as long as the *vesicle*; *vesicle* very large and swollen, a little wider than the second segment, its height equal to its width, coriaceous below.

Palpi large; humerus granular throughout, the keels sharp and coarsely granular, the anterior and posterior surfaces furnished with an extra abbreviated keel, which on the first is composed of about six sharp tubercles: brachium also granular, furnished with five strong granular keels, its anterior surface armed with two denticles, of which the inferior is considerably the larger; the lower surface furnished with a series of 7 setiferous pores: manus twice as wide as the brachium, the length of the hand-back about equal to that of the movable digit and less than that of the carapace, the manus granular throughout, its upper surface flat and bordered externally (behind) by a strong and internally by a weaker granular keel, which take their origin from the immovable digit, the external surface of the hand convex and carinate; keel of the hand-back strong and granular; the movable digit as long as the fifth segment of the tail, with a large lobe in the middle of its length, the immovable correspondingly notched.

Legs very finely granular.

Pectines short, furnished with 5 teeth.

Stigmata elongate, the aperture crescentic.

Measurements in millimetres.—Total length 68, of carapace 9, of tail 36·5; width of first segment 3·5, of fifth 2·5, of vesicle 3·5; width of brachium 3·2, of manus 6; length of hand-back 8, of movable digit 9·8.

Loc. Simla, in the Himalayas. Coll. Schlagintweit.

Two female examples, the one above described and a second smaller one measuring 47 millim., of which the carapace is 6·2 and the tail 24.

There are also two more adult female specimens of approximately the same size as the one described, but without localities. These are blacker in colour, with the palpi rather more robust. There is, in addition, a small example, the carapace of which measures only 5·5 millim., while the fingers are scarcely lobate and the manus is only one third wider than the brachium.

This species may be recognized from *Hardwickii**, of which the type is preserved in this Museum, by its much larger size, the average length of *Hardwickii* being 36 millim. (one example in the collection is 46 millim.), its thinner and longer tail, thinner hand, &c.

The specimens that I have described differ from those examined by Karsch in the proportions of the fifth caudal segment and in having the carapace about as long as the first two caudal segments. These differences, however, are, I suspect, merely sexual.

Scorpiops leptochirus, sp. n. (Pl. XIV. fig. 11.)

Colour nearly black; chelicerae and vesicle infusate, distal tarsal segment ferruginous.

Carapace weakly granular, the ocular tubercle shallowly cleft, the eyes on it rather large and separated by a space which is rather larger than a diameter; the lateral eyes distinct, the posterior the smallest and close to the median one.

Tergites studded with low, smooth, shining granules, a median granular keel; the last with 4 short weak keels.

Sternites smooth, the last furnished with 4 granular keels.

Tail robust, less than three and a half times the length of the carapace, which is almost as long as the first two segments and half the third, posteriorly attenuated; the second segment as long as wide, the fourth about one fourth longer than wide, the fifth not twice the length of the second, the normal keels well developed and granular, the intercarinal spaces weakly granular, these granules arranged in a reticulated pattern;

* ? *Syn. solidus*, Karsch.

the posterior granule of the superior keels a little larger than the rest and bifid; the median lateral keel complete and posteriorly down-curved on the first segment, represented by merely a few granules on the second, and extending over about two thirds of the fifth segment, the inferior keels of the fifth posteriorly denticulate. *Vesicle* of moderate size, about as high as wide and a little narrower than the fifth segment, finely granular or coarsely coriaceous below.

Palpi with the keels well developed and granular and with the intercarinal spaces closely and finely granular, the granules being arranged in a reticulated pattern; the humerus nearly smooth behind, its inferior keel absent distally and with only a few granules, forming a short upper crest on its distal half; the keels of the brachium granular; seven inferior piliferous pores and a single small inferior tubercle in front; manus rather narrow, not twice the width of the brachium, the hand-back a little shorter than the carapace but a little longer than the fifth caudal segment, shorter than the movable dactylus, which equals the carapace in length; the keels of the hands not strong, the external aspect of the segment convex, only weakly crested.

Legs externally weakly granular.

Pectines furnished with 6 or 7 teeth.

Measurements in millimetres.—Total length 49·5, of carapace 8, of tail 27·5; width of first segment 3·5, of fifth 2·5, of vesicle 2·3, of brachium 3, of hand 5; length of hand-back 7, of movable digit 8.

A single (probably female) example without locality.

Differs from *S. Petersii* in its stouter and shorter tail, narrower vesicle, larger eyes, less strongly carinate palpi, &c. From *S. Hardwickii* by the granular keels on the external surface of the brachium, narrower, less strongly crested hands, larger and closer eyes, &c.

Scorpiops longimanus, sp. n. (Pl. XIV. fig. 12.)

Colour (dried) a uniform dull brown.

Carapace as long as the anterior three caudal segments, somewhat coarsely and closely granular, with strong granular superciliary crests and strong crests on each side of the anterior groove; ocular tubercle cleft, the distance between the eyes a little greater than a diameter; lateral eyes distinct, the posterior a little nearer the median than the latter is near the anterior.

Tergites thickly and coarsely granular throughout, the keel conspicuous and granular; the last furnished with five granular keels.

Stergites smooth, the last furnished with four weakly granular keels.

Tail short, only about three times the length of the carapace, posteriorly attenuate, the second segment as wide as long and about half the length of the fifth; the keels developed as in the preceding species, except that the upper ones on the second to fourth segments have the terminal denticle enlarged and bifid; *vesicle* long, compressed, as wide as the fifth segment, as high as wide, almost smooth beneath.

Palpi long, the humerus about as long as the carapace; all the normal keels well developed and granular, the spaces between them also somewhat coarsely granular; brachium with ten pores on its lower surface and two very large and sharp teeth, as well as a few smaller ones on its anterior surface; hand not nearly twice as wide as the brachium, narrow, more than twice as long as wide, the hand-back nearly twice as long as the width of the hand and slightly longer than the carapace; the movable dactylus a little longer than the hand-back; the immovable digit nearly four times as long as it is wide at the base, the inner edge of the digits nearly straight.

Legs externally granular.

Pectines furnished with 8 teeth.

Length about 50 millim., of carapace 9·3, of tail 27·5; width of brachium 3·5, of manus 5; length of hand-back 9, of movable digit 9·8.

A single female example from Silhet.

This species appears to differ from *S. montanus* of Karsch in having the carapace and palpi coarsely instead of very finely granular, and in having the movable digit longer instead of shorter than the hand-back.

From *anthracinus*, Simon, it may be recognized by having ten pores on the lower surface of the brachium instead of nineteen, and from *S. Lindstroemii* and *lugubris* by having ten instead of fifteen of these pores.

Scorpiops Binghamii, sp. n. (Pl. XIV. fig. 13.)

Colour nearly black, the tergites obscurely spotted with ferruginous; the lower surface and the feet ochraceous or ferruginous, the vesicle ferrugineo-fuscous.

Carapace and *tergites* distinctly but not very coarsely granular, the superciliary crests pronounced; ocular tubercle cleft above, the eyes large and separated by a space that is about equal to a diameter; the postero-lateral eye the smallest, the space dividing it from the median eye greater than the space between the anterior and median eye and a little smaller

than the diameter of the small eye. The median keel on the tergites rather weak, but the four granular keels on the last tergite strong.

Sternites smooth, impressed with large punctures; the last with four granular keels.

Tail constructed as in the preceding species, but rather stronger, being more than three times the length of the carapace, which is shorter than the first three segments by about one third of the third segment, and the second segment is wider than long, and the third as wide as long.

Palpi almost as in the preceding species, but with the keels weaker and not so strongly granular, while the intercarinal spaces also are less strongly granular; there are thirteen pores on the lower surface of the brachium; the length of the hand-back considerably exceeds that of the carapace and of the movable digit, these two being equal—it equals, in fact, the first three caudal segments; the digits are rather short, distinctly lobate and sinuate in their proximal half, the height of the immovable at the base being about one third of its length.

Legs externally granular.

Pectines large, with distinct fulcra and 9 teeth.

Total length 55 millim., of carapace 8, of tail 27; width of brachium 3, of hand 5; length of hand-back 9, of movable digit 7.

A single adult male from Central Tenasserim, collected by — Bingham, Esq.

This species, with its slender hands, strongly crested superior caudal keels, &c., belongs to the same category as *S. montanus*, Karsch, *anthracinus*, Simon, *Lindstroemii* and *lugubris*, Thorell, and *longimanus*, sp. n. It differs from *montanus* at least in having the carapace shorter than the anterior three caudal segments and in having the carapace considerably shorter than the hand-back. From *anthracinus* it may be recognized by having thirteen instead of nineteen pores on the brachium, from *Lindstroemii* and *lugubris* by having thirteen instead of fifteen pores, and from *longimanus* by having thirteen instead of ten pores, &c.

ANUROCTONUS, gen. nov. (Pl. XIV. figs. 14 and 15.)

Allied to *Uroctonus*, Thorell, but differing at least in having a single tooth instead of a series of teeth on the lower edge of the movable digit of the chelicerae.

Type *Anuroctonus phæodactylus* (Wood).

Of this species I have seen a single specimen (female, with

normal aculeus) from Virginia, belonging to the collection of Owens College, Manchester.

It is a singular thing that Dr. Karsch, who has seen this species, referred it to *Uroctonus*, and characterizes *Uroctonus* as having a series of teeth on the lower border of the digit of the chelicerae. Dr. Marx also referred it to *Uroctonus*. But I cannot see any series of teeth at all comparable to the series presented by *Uroctonus*. On the contrary, there is only one tooth, not so large it is true as the one in *Hadrurus*, but occupying the same position, and the edge in front of this may be finely roughened; but there is no structure presented that I should call a series of teeth.

Of course a solution to the difficulty is that I have examined a species which is not *phaedactylus*. I cannot, however, without further evidence bring myself to believe this, on account of the closeness of the application of Wood's description to my specimen.

HADRUIDES, gen. nov. (Pl. XIV. figs. 16 and 17.)

Allied to *Caraboctonus*, Pocock, but recognizable by the dentition on the digits of the chelæ.

In *Caraboctonus Keyserlingii* the median series consists of a few (six) longitudinal slightly overlapping rows of denticles, the posterior denticle of each being enlarged, while on the inner side of the anterior extremities of each row there is a large tooth, all the large teeth together forming an inner series. This arrangement is well shown in fig. 21, pl. lxxxiii. vol. ii. of the Trans. Zool. Soc.*

In *Hadruiodes* the dentition is on the same plan as in *Caraboctonus*, but the large teeth of the inner series are further back from the ends of the median rows, and close to the latter on the outer and inner side are a few (two or three) supernumerary denticles.

Type *Hadrurus charcasus* (Karsch).

On p. 92 of the August number of the 'Annals' for this year I referred *H. charcasus* of Karsch to *Caraboctonus*. But the dentition of the chelæ seems to me to be of sufficient importance for the establishment of a genus †. The species in the Museum identified as probably *maculatus* or *robustus*,

* In fact there can be no doubt that the "*Telegonus* from Coquimbo" mentioned and figured by Prof. Lankester in this paper is the specimen I have made into the type of *Caraboctonus Keyserlingii*. Further details are represented on pl. lxxxii. figs. 4, 12, and 16, and pl. lxxxiii. figs. 7 and 19.

† The differences between *Caraboctonus* and *Hadruiodes* are strictly comparable to those that obtain between *Centrurus* and *Tityus*.

and also referred (*ibid.*) to *Caraboctonus*, I now transfer to this new genus. I may mention that, in addition to the clothing of the soles of the feet, both *Caraboctonus* and *Hadruroides* differ from *Hadrurus* in having the ocular tubercle in front of the middle of the carapace.

EXPLANATION OF THE PLATES.

PLATE XIV.

- Fig. 1. *Tityus Quelchii*, sp. n. Vesicle.
 Fig. 2. *Opisthacanthus elatus* (Gerv.). Sternum and operculum of male.
 Fig. 2 a. Ditto. Ditto of female.
 Fig. 3. *Opisthocentrus africanus* (Sim.). Sternum and operculum of male.
 Fig. 3 a. Ditto. Ditto of female.
 Fig. 3 b. Ditto. Foot, side view.
 Fig. 4. *Chironachus ochropus* (C. K.). Foot, side view.
 Fig. 5. *Iomachus leviceps* (Pocock). Foot, side view.
 Fig. 6. *Hormurus de Changei* (Becker). Foot, side view.
 Fig. 7. *Urodacus pluinimanus*, sp. n. Hand.
 Fig. 8. *Urodacus Woodwardii*, sp. n. Vesicle from the side.
 Fig. 8 a. Ditto. Vesicle from below.
 Fig. 9. *Urodacus novæ-hollandiæ*, Pet. Vesicle from side.
 Fig. 9 a. Ditto. Vesicle from below.
 Fig. 10. *Scorpiops Petersii*, sp. n. Hand.
 Fig. 11. *Scorpiops leptochirus*, sp. n. Hand.
 Fig. 12. *Scorpiops longimanus*, sp. n. Hand.
 Fig. 13. *Scorpiops Binghami*, sp. n. Hand.
 Fig. 14. *Anuroctonus phæodactylus* (Wood). Dentition of digit of chela.
 Fig. 14 a. Ditto. Dentition of movable digit of chelicera.
 Fig. 14 b. Ditto. Foot.
 Fig. 14 c. Ditto. Vesicle.
 Fig. 15. *Uroctonus mordax*, Thor. Dentition of movable digit of chelicera.
 Fig. 16. *Hadruroides charcasus* (Karsch). Dentition of digit of chela.
 Fig. 17. *Caraboctonus Keyserlingii*, Pocock. Dentition of digit of chela (after Lankester).

PLATE XV. B

- Fig. 1. *Urodacus planimanus*, sp. n. Foot from the side, to show the lobes and the spine armature.
 Fig. 1 a. Ditto. Foot from below, to show the single spur characteristic of the Scorpionidæ.
 Fig. 2. *Hemiscorpius lepturus*, Peters. Foot from below, showing spur and spine armature.
 Fig. 3. *Iurus Dufourei* (Brullé). Foot from below, to show the two spurs and the hairy clothing.
 Fig. 4. *Cherilus variegatus*, Sim. Foot from below.